ON *LEAIA MITCHELLI*, ETHERIDGE, FIL., FROM THE UPPER COAL MEASURES OF THE NEWCASTLE DISTRICT.

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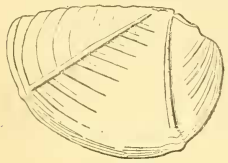
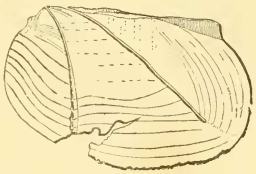
At the present time but one fossil genus of Phyllopoda is known from the whole of Australia, viz., *Estheria*, comprising two species. The first discovered was *Estheria Coghlani*, Cox, from the Estheria Shales, above the productive Upper Coal Measures, obtained from





several bores in the Sydney District. The second species was collected by Mr. J. H. Simmonds, of Brisbane, in the Ipswich Coal Measures, and communicated by him to the writer. It does not appear to differ from *Estheria mangaliensis*, Jones,* of the Damuda beds of Central India.

It has often been a matter of conjecture to the writer and several geological friends how to account for the absence, under such favourable conditions, of *Estheriæ*, from the vast accumulations of estuarine and swamp deposits represented by our Upper

* Mon. Foss. Estheriæ (Pal. Soc.), 1862, p. 78, pl. ii. f. 16-23.

Coal Measures. This hiatus has now been filled by Mr. Mitchell's discovery at Charlestown, between Newcastle and Lake Macquarie, of a *Leaia*, one of the most interesting genera of extinct Phyllopoda. As a slight mark of appreciation of my friend's persevering efforts in assisting to unravel the Palæontology of N. S. Wales, I beg to name the fossil *Leaia Mitchelli*.

There are at present known eight forms of *Leaia*, species or varieties,* as the case may be, extending from the Old Red Sandstone to the Permian in Geological time, with which the new form will be compared.

Leaia Mitchelli possesses transversely oblong carapace valves, and as usual a more or less straight dorsal margin, angular at the posterior end, but the anterior and ventral margins rounded. The lateral carinæ, two in number on each valve, increase in thickness as the umbones are receded from, the anterior being slightly curved, the posterior straight and diagonal, and separating the valves into two unequal moieties. The concentric laminæ resemble those of other species.

The type species, *L. Leidyi*, Lea, sp.,† is easily distinguished from our form by its remarkably oblong-rectangular outline and very scanty coarse concentric laminæ, the direct anterior carinæ, and the sweep of the posterior ridges. The same remarks practically apply to the var. *Williamsoniana*, Jones,‡ from the Upper Coal Measures of Manchester (Eng.).

The second variety of the type species, var. *Salteriana*, Jones,§ is more akin to *L. Mitchelli*, but the much shorter, wider and more robust appearance of the former, and the emarginate posterior end of the latter separate the two. Var. *Salteriana* occurs in the Calciferous Sandstone Series of Fifeshire (Scot.).

The Coal Measures of Saarbrück, North Germany, have yielded a *Leaia*, known as *L. klieveriana*, Goldenberg, in which there is a

*See Etheridge, junr., Ann. Mag. Nat. Hist. 1879, iii. (5), p. 262; Etheridge, Woodward, and Jones, Brit. Assoc. Report for 1887 [1888], Pt. 1, p. 66.

† Jones, Mon. Foss. Estheriæ (Pal. Soc.), 1862, t. 5, f. 11 and 12.

‡ *Loc. cit.*, t. 1, f. 19 and 20.

§ Jones, *loc. cit.*, t. 1, f. 20.

third carina on each valve, intermediate between the anterior and posterior. It is much shorter than these, reaching across only about one-third of the valves' width. It is obvious that the Newcastle species could not be referred to *L. klieveriana*.

Leaia Jonesi, mihi,* is another species from the Scotch Calciferous Sandstone Series, but here the diagonal carina is entirely absent from both valves; and it is thus equally obvious that no specific relation can exist between it and *L. Mitchelli*. The valves of *L. Jonesi* are thus divided into two very unequal portions.

In the Coal Measures of Illinois, a peculiar species is met with, named by Messrs. Meek and Worthen, *L. tricarinata*.† In general outline it is not dissimilar to the Australian form, but like *L. klieveriana* it possesses a third carina. This, however, is obliquely placed immediately under the dorsal margin, and when the united valves are viewed in apposition from above, the dorsal margin of each valve is seen to be inflected "at right angles to the plane of the valves, so as to form a distinct lanceolate corselet." Now, in all the examples of *L. Mitchelli* I have seen, there is no trace of this third keel.

The remaining species of *Leaia*, *L. wettinensis*, Lespeyres, from the Coal Measures of Wettin, and *L. bentschiana*, Geinitz, from the German Lower Permian, I am not able to refer to, from the absence of the necessary literature, but full references will be found to them in my previously quoted paper,‡ and the "Fifth Report of the British Association Committee on the Fossil Phyllopoda of the Palæozoic Rocks."§

It follows from this that we have in our Upper Coal Measures a *Leaia* possessing all the general features of the genus, and most nearly allied to *L. Leidyi* var. *Salteriana*, Jones.

For the figures I am indebted to Mr. Charles Hedley, F.L.S.

The following is the abbreviated diagnosis :—

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* Ann. Mag. Nat. Hist. 1879, iii. (5), p. 257.

† Illinois Geol. Survey Report, 1868, iii. p. 541, f. B 1-3, and ? C.

‡ Ann. Mag. Nat. Hist. 1879, iii. (5), p. 262.

§ Brit. Assoc. Report for 1887 [1888], p. 66.

LEAIA MITCHELLI, sp.nov.

Sp. char.—Carapace valves transversely oblong; dorsal margin straight, and without any trace of inflection; anterior outline rather produced and rounded; posterior margin obliquely truncate, slightly emarginate at its junction with the dorsal margin, rounded below and graduating invisibly into the ventral margin; umbones sharp, anterior, but not terminal; lateral carinæ prominent and well marked, increasing in thickness as the umbones are receded from, the anterior slightly curved, but reaching the ventral margins at a point almost vertically beneath the umbones, the posterior straight and diagonal, separating the valves into unequal halves, the anterior being the larger; surface bearing fine, regular, concentric laminæ, angulated at the carinæ to correspond with the outline of the valves, but frill-like on crossing the former.

Loc. and Horizon.—Charlestown, between Newcastle and Lake Macquarie :—Upper Coal Measures—*Coll. Mitchell.*